

Work Environment and Musculoskeletal Complaints of Grinding Worker of Brass Crafts

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Work environment and musculoskeletal complaints of grinding workers of brass crafts

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Abstract. Brass handicraft was an informal industry in the Juana Subdistrict. Many types of work related to brass handicrafts. One of them is grinding work, which to smooth the metal pouring. The grinder worker works for 8 hours a day with a 1-hour break for rest. There is a lack of working environment and poor ventilation. This can affect work disruption and employee complaints. This aim of the study was to describe the working environment of grinding wheels in Brass handicraft SMEs, and worker complaints work in it. This research method using an observational approach by describing the grinding work environment and employee complaints. 32 grinding workers in Brass handicraft SMEs were included. The results showed that the work environment was poor sanitation, lack of ventilation and the room is narrow compared to the work tools installed. The workers worked with unergonomic work tools and heat stress exposure. The most musculoskeletal complaints are waist, back, neck and shoulder complaints. Grinder workers feel uncomfortable with their work environment. It must control the work environment by providing knowledge about occupational safety and health for the owner and worker. This effort can be done by establishing UKK post, as the center of preventive and promotive efforts of work health in Handicraft Brass SMEs.

1. Introduction

Juwana was located in Pati Regency, Central Java Province is famous for outstanding brass metal craft products. There were 220 small brass handicraft industries with a total of 5,483 workers. The large number of workers working in Brass SMEs. It shows that small industry has contributed to the welfare and economy of the citizens of Juwana. The brass handicraft owners are usually hereditary efforts and self-taught learning. They do work habitually. This was shown by Brass SMEs, which is located close to each village and does almost the same work. Typology of workspace and work tools used are also almost similar. Although the volume of work and the number of workers is different, the typology of work tools and workspace used is almost the same. In general, the work of brass handicrafts starts from casting, cutting, drilling, grinding, coating with electroplating, finishing and packing. Each of these jobs is done by a special worker. Grinding machine is one of the tools which used at Grind's Job. This job requires high concentration because the purpose of this work is to smooth the shape of the item according to the desired shape. This work is usually done in a special room. The work tool used is a grinding machine that is driven by electric power. Workers usually work in a sitting position for a long time. Grinding workers like other workers, work for 8 hours a day with a one-hour break for lunch. This work has done in an inconvenient space with the presence of waste products such as metal particle dust. There are some work risk and hazard which potentially disturb health worker [1]. It is



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important to protect the workers from occupational illness and work accident [2] if any worker gets an occupational illness because the work environment, it can reduce productivity. It can also because of mortality at the SMEs Worker[3]. Therefore, it needs mapping about work environment condition and health complaint related to the Grind's Job at the Brass SMEs. This study aimed to describe the work environment of grinding work in Brass SMEs and musculoskeletal complaints of their workers.

2. Methods

This research is a descriptive study. It describes the work environment conditions of grinding work in Brass Craft SMEs with observation methods. Musculoskeletal complaints conducted by survey method using a questionnaire. Work environment conditions were described by environmental quality. It was observed in three Craft SMEs located in different villages. According to Nitisemito, the work environment is everything that is around the workers that can affect the worker in carrying out their tasks [4]. Sedarmayanti states that the work environment can be divided into two, namely the physical work environment and non-physical work environment [5]. This study only described the physical environment affected. The selected SMEs were choice from the volume of work and products. It was small, medium and largescale SMEs. Musculoskeletal complaints are measured using Nordic Body Map size [6], which is in the form of a body map with parts to indicate where the complaint is. Musculoskeletal complaints were measured on a scale of 1 for no complaints until the scale of 4 for complaints is very painful. It measures 32 workers who work in grinding work. The results of observations of the work environment are described qualitatively by a narrative. While musculoskeletal complaints are presented using the table.

3. Result

The study was conducted in 3 Brass SMEs located in 3 different villages, namely Karangrejo Village, Tluwah Village and Beringin Village, Juana Subdistrict, Pati Regency. The selected SMEs represent small, medium and rather large SMEs. The sample is carried out purposively by looking at the number of employees and the wide area of production.

3.1. Work environment

This study observed physical work environment which is all physical conditions that exist around the workplace that can affect employees both directly or indirectly. The working conditions of the grinding work weren't many variations, even though the number of workers was different. Grinding chamber is always located in a building with a closed space. The area of the room ranges from 2 meters X 2 meters until 3 meters x 4 meters. The walls of the room are simply painted. There is even a wall that is only of brick without cement. Grinding rooms are only made as simple as possible, far from special designs. The Observations on the quality of the work environment are described as follows

3.1.1. Lighting at work

The Lighting is an important aspect of the physical environment for work safety. It greatly affects the human ability to see objects clearly, quickly, and without causing errors. Good lighting is needed because grinding work requires precision. Lighting in the grinding workspace shows moderate lighting, not too bright nor too dark. Lighting comes from fluorescent lamps. It is about 1 to 2 pieces. To make maximum lighting, the lamp is placed near the grinding machine, by the way, the lamp is hung on the roof with a long cable. There are no lights sitting on the table. Lighting lamps are used to illuminate the room while the grinding machine when operated. When workers use grinding machines, the worker's head looks sharp and close to the grinding machine. This is because the light is not bright enough and focuses on the grinding machine and the product.

3.1.2. Air Temperature at Work

There is not an Air Conditioner in the grinding room. The temperature of the workspace depends on the temperature of the surrounding environment. The room temperature around the grinding machine

tends to be rather hot because there are lights placed on top of the grinding machine that is hung on the roof. In general, the room temperature tends to follow a relatively hot outside temperature. To overcome the temperature, the owner of the SMEs makes the room does not have a ceiling, directly on the roof, so that the height of the room is relatively high. In general, the room temperature is not comfortable to work.

3.1.3. Moisture at the Workplace

The grinding chamber is a closed room without a window, so it feels a damp room. There is lighting from an electric lamp, but there are so many work tools found in the grinding room. Moreover, the air circulation system is only supported by a slight vent, so the room smells moist.

3.1.4. Air Circulation at Work

A grind's room has no windows and only has a few vent holes. This is the cause of air circulation is not optimal. There is only a small vent on the wall of the room, located above the room. The room has only one door. Air circulation in the room is not maximal, because the big hole is only the door. This door is not directly facing out, but the door between the rooms, so there is no direct air change with the outside environment. In general, air ventilation in the grinding chamber is not good

3.1.5. Workplace Noise

The work situation in the grinding room is very noisy. This is due to the sound of the grinding machine when smoothing the product. The voice was heard outside the workplace. To overcome boredom, at the request of workers, the owner provides a radio that is set with a very large volume, to play dangdut songs. According to the owner, without the sound of music from the radio with a large volume, the workers are not excited. So, besides the noise caused by the operation of the grinding machine, it also added a loud noise from the volume of music radio installed in the workroom.

3.1.6. Smells at Work

When we entered the grinding room, the smell of metal friction was very intense. This is because there is no adequate ventilation for odor removal due to the friction of the grinding machine with brass products. The Smell is very sharp in the room that is due to the room is narrow.

3.1.7. Dust at Work

Grinding chamber is very dusty because the particles left from brass products are done by grinding machines. Almost all objects and rooms are covered with dust. When the grinding work is done, the remaining production particles are scattered around. There are no vacuum cleaners in the room. Visual observation shows dust sticking to walls, floors, work tools and all objects in the grinding chamber.

3.2. Musculoskeletal Complaints

Musculoskeletal complaints were measured using a score, with a scale of 1 for no complaints, a scale of 2 complaints mild pain, a scale of 3 for painful and a scale of 4 for severe painful complaints. Results of Measurement Musculoskeletal complaints in workers are upper neck pain, right shoulder pain, lower neck pain, back pain, and buttock pain. The most complaints are waist pain that 59.6% of the workers said they had pain in their waist. The distribution of musculoskeletal complaints is presented in the following table

Table 1. Distribution of musculoskeletal complaints

Complaints	Participants reporting musculoskeletal complaints (%) (n=32)			
	None	Mild	Painful	Severe
Upper neck pain	50,0	28,1	18,8	3,1
Lower neck pain	53,1	25	21,9	0
Left shoulder pain	43,8	31,3	25	0
Right shoulder pain	50,0	21,9	28,1	0

Upper left arm pain	71,9	9,4	15,6	3,1
Back pain	56,3	12,5	25,0	6,3
Upper right arm pain	56,3	37,5	6,3	0
Waist pain	40,6	31,3	21,9	6,3
Buttock pain	56,3	37,5	3,1	3,1
Buttock pain	62,5	34,4	3,1	0
Left elbow pain	81,3	18,8	0	0
Right elbow pain	81,2	18,8	0	0
Lower left arm pain	78,1	18,8	3,1	0
Lower right arm pain	78,1	18,8	3,1	0
Left wrist pain	81,3	15,6	3,1	0
Right wrist pain	71,9	21,9	6,2	0
Left-hand pain	75,0	21,9	3,1	0
Right-hand pain	65,6	28,1	6,3	0
Left thigh pain	75,0	25,0	0	0
Right thigh pain	75,0	25,0	0	0
Left knee pain	75,0	25,0	0	0
Right knee pain	65,6	34,4	0	0
Left calf pain	71,9	25,0	3,1	0
Right calf pain	78,1	18,8	3,1	0
Left ankle pain	81,2	18,8	0	0
Right ankle pain	78,1	21,9	0	0
Left foot pain	65,6	28,1	6,3	0
Right foot pain	65,6	28,1	6,3	0

Based on observations of the work environment, and musculoskeletal complaints of workers, it can be concluded that the work environment of grinding workers, in general, is an uncomfortable work environment, therefore many cause musculoskeletal complaints with the workers. All parts of the worker's body, in accordance with the Nordic body map, were complained, starting from mild pain to severe.

4. Discussion

The working environment of Brass SMES grinding workers was poor, considering the work environment factor does not support the workers. This is also consistent with Ambarita's research, which states that the dangers of the work environment in more brass craft SMEs are physical hazards derived from the machines used, as well as chemical hazards during the work process of both steam and metal dust [7]. The use of grinding machines will create a dangerous work environment such as metal dust and sparks [8]. The work environment needs to be controlled for occupational health and safety efforts. Such conditions are caused by low awareness of workers and owners in managing their work environment and lack of control over the implementation of OSH among workers [9].

In addition, the ignorance of both workers and owners of aspects of OSH management that should be applied also influence the omission of working environment conditions. Because of ignorance, often labor has a higher risk in relation to health problems suffered due to work [3]. This appears to be a musculoskeletal complaint in many workers, such as waist pain, left shoulder pain, upper neck pain, right shoulder pain, lower neck pain, back pain, and buttock pain. If the muscle receives a static load repeatedly and for a long time, it will cause complaints in the form of damage to the joints, ligaments, and tendons. Complaints to this damage often occur in the muscles of the neck, shoulders, arms, hands, back, and waist and lower muscles [10]. A work environment that does not support the works can put more weight on physical work. Heavy physical work is a factor associated with musculoskeletal complaints [11]. Therefore, promotive and preventive efforts are needed, to control the danger of the work environment that does not support its workers. Continuous effort is required to educate and increase the awareness of workers. These efforts are a forum that is carrying out preventive and promotive efforts in Occupational Health and Safety [12]. The UKK post is a form of community empowerment in the informal worker's group, especially in promotive, preventive efforts to protect workers in order to live healthy and free from health problems and the bad effects caused by work. The UKK post is an organization of a planned, regular and sustainable set of workers' health

care efforts organized from, by and for the community. The UKK post is managed by occupational health cadres who have the awareness and willingness to volunteer themselves to improve and maintain themselves and their groups so that they can work safely, healthily and productively. The UKK post establishment is equipped with facilities for Personal Protective Equipment, OSH Promotion Media, Medicines First Aid, and OSH Recording and Reporting System Application to monitor the health conditions of its workers [13]. The establishment of Pos UKK is very effective in shaping knowledge and attitudes towards occupational health and safety efforts among workers. This is because UKK post is a form of participation of the working community that facilitated by experts or health workers at the Health Centre level in pursuing workers' health in the form of participation from, for and by the community [14]. To increase awareness and care of workers and owners of work safety, one of the SMEs in the research location has established UKK post. It was managed by trained cadres of OSH. SMEs workers and owners strive to pay more attention to aspects of OSH including work environment conditions and musculoskeletal complaints. This activity was applied in the form of a community partnership program that has established UKK post as an effort to improve the health and safety of brass handicraft SMEs workers

5. Conclusions

The Grinding working environment in Brass SMEs is still in poor condition, like temperatures that are uncomfortable, poor circulation of air and the amount of dust that can be a health and safety risk, as well as a large number of musculoskeletal complaints. The most musculoskeletal complaints are complaints at the waist, neck, and shoulders. Therefore, Brass SMEs Workers and Owners need to establish UKK post, as a place for preventive and curative efforts, while raising awareness of workers and owners of the importance of occupational safety and health in Brass SMEs.

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